

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: MOLLER, ET AL.

ART UNIT: 3662

APPLN. NO.: 10/805,996

EXAMINER: BARKER, MATTHEW

FILED: 03/22/2004

TITLE: RADIO FREQUENCY ANECHOIC CHAMBER WITH IMPROVED
TEST STAND

AMENDMENT AND REPLY UNDER 37 C.F.R. § 1.111

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Responsive to the Office Action dated March 8, 2006, consideration of the following amendments and remarks and withdrawal of the current objections and rejections is respectfully requested.

Please amend the above-referenced application as follows:

Amendments to the Claims begin on page 2 of this paper.

Remarks begin on page 9 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (currently amended) A radio frequency anechoic chamber comprising:
a test stand comprising:
a first vertical support column, said first vertical support column
comprising one or more radio frequency absorbers in a tube shape with tapered protrusions distributed over, at least, a longitudinally extended portion of said first vertical support column.
2. (original) The radio frequency anechoic chamber according to claim 1 wherein said one or more radio frequency absorbers comprise carbon filled open cell foam.
3. (original) The radio frequency anechoic chamber according to claim 1 wherein:
said one or more radio frequency absorbers are disposed proximate a periphery of said first vertical support column.

4. (original) The radio frequency anechoic chamber according to claim 3 wherein:
said one or more radio frequency absorbers are distributed over an area that extends proximate, at least, a substantial portion of a circumference of the first vertical support column.
5. (original) The radio frequency anechoic chamber according to claim 4 wherein:
said one or more radio frequency absorbers comprises a layer of radio frequency absorbing material.
6. (currently amended) The radio frequency anechoic chamber according to claim 5, wherein:
~~said layer comprises an edge that comprises a plurality of tapered protrusions, that~~
extend substantially longitudinally with respect to said first vertical support column.
7. (original) The radio frequency anechoic chamber according to claim 5, wherein:
said one or more radio frequency absorbers are present in an amount of absorber per unit height that decreases as a function of height along the first vertical support column.
8. (original) The radio frequency anechoic chamber according to claim 4 wherein:
said first vertical support column comprises a first hollow tubular member; and
said one or more radio frequency absorbers are disposed within said first hollow tubular member.

9. (original) The radio frequency anechoic chamber according to claim 8 wherein:
the first hollow tubular member is circular in cross section.
10. (original) The radio frequency anechoic chamber according to claim 8 wherein:
the first hollow tubular member comprises a fiberglass tube.
11. (original) The radio frequency anechoic chamber according to claim 8 wherein:
said one or more radio frequency absorbers comprise a layer of radio frequency
absorbing material.
12. (currently amended) The radio frequency anechoic chamber according to claim 11,
wherein:
~~said layer or sheet comprises an edge that comprises a plurality of tapered~~
protrusions, ~~that~~ extend substantially axially with respect to first vertical support column.
13. (original) The radio frequency anechoic chamber according to claim 10, wherein:
the fiberglass tube has a diameter of at least 30 centimeters, and a wall thickness of less
than 1.5 millimeters.

14. (currently amended) The radio frequency anechoic chamber according to claim 8 wherein:

said test stand comprises a second vertical support column, disposed below said first vertical support column, in supporting relation to said first vertical support column, wherein said first vertical support column is characterized by a first transverse dimension, and said second vertical support column is characterized by a second transverse dimension, and said second transverse dimension is less than said first transverse dimension, whereby said first vertical support column overhangs said second vertical support column.

15. (original) The radio frequency anechoic chamber according to claim 14 further comprising:

a swing arm adapted to support a measurement antenna, and swing through a range of polar angle about a first axis that intersects an axis through said test stand, wherein, at large polar angles said swing arm comes near to said second vertical support column, and in such orientations, positions said measurement antenna to view an equipment under test antenna disposed above said first vertical support column, wherein a line of sight between said measurement antenna and said equipment under test antenna intersects said first vertical support column.

16. (original) The radio frequency anechoic chamber according to claim 14 further comprising:

a third vertical support disposed above, and supported by said first vertical support column.

17. (original) The radio frequency anechoic chamber according to claim 16 wherein said third vertical support comprises expanded polystyrene.

18. (original) The radio frequency anechoic chamber according to claim 16 further comprising:

a radio frequency test model disposed above, and supported by said third vertical support.

19. (original) The radio frequency anechoic chamber according to claim 14 further comprising:

a first connecting member having a first rim, and a first plurality of fingers extending radially inward from said first rim, wherein said first rim is attached to a lower end of said first vertical support column; and

a second connecting member having a second rim, and a second plurality of fingers extending radially outward from said second rim, wherein said second rim is attached to an upper end of said second vertical support column, and said first and second plurality of fingers are disposed in overlapping relation.

20. (currently amended) A radio frequency anechoic chamber comprising:
- a test stand comprising:
 - a first vertical support column, said first vertical support column comprising one or more radio frequency absorbers in a tube shape with tapered protrusions disposed proximate a periphery of said first vertical support column.
21. (original) The radio frequency anechoic chamber according to claim 20 wherein said one or more radio frequency absorbers comprise carbon filled open cell foam.
22. (currently amended) A stand for supporting radio frequency equipment under test in an anechoic test chamber, the stand comprising:
- a vertical support column; and
 - one or more radio frequency absorbers in a tube shape with tapered protrusions distributed over, at least, a longitudinally extended portion of said vertical support column.
23. (original) The stand according to claim 22, wherein:
- said one or more radio frequency absorbers are present in an amount of absorber per unit height that decreases as a function of height along the vertical support column.

24. (original) The stand according to claim 22 wherein:

said vertical support column comprises a hollow tubular member; and

said one or more radio frequency absorbers are disposed within said hollow tubular member.

25. (original) The stand according to claim 22 wherein:

said one or more radio frequency absorbers are disposed proximate a periphery of said vertical support column.

26. (original) The stand according to claim 25 wherein:

said one or more radio frequency absorbers comprises a layer of radio frequency absorbing material.

REMARKS

The issues currently in the instant application are as follows:

- Claims 1, 3-13, 20, and 22-26 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,028,928 (Vidmar).
- Claims 1, 3-7, 20, 22-23, and 25-26 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,099,244 (Larson).
- Claims 1, 3-5, 20, 22, and 25-26 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,274,048 (Tricoles).
- Claims 2 and 21 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,028,928 (Vidmar) in view of U.S. Patent No. 5,812,080 (Takahashi).
- Claims 2 and 21 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,099,244 (Larson) in view of U.S. Patent No. 5,812,080 (Takahashi).
- Claims 2 and 21 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,274,048 (Tricoles) in view of U.S. Patent No. 5,812,080 (Takahashi).
- Claims 14-19 are objected to as being dependent upon a rejected base claim.

Applicant traverses all the outstanding objections and rejections and requests reconsideration and withdrawal thereof in light of the amendments and remarks contained herein.

Amendments to the Claims

Claims 1, 20, and 22 have been amended to specify that the one or more radio frequency absorbers are "in a tube shape with tapered protrusions." The amendment is

supported by page 11 lines 10-19, claims 6 and 12, and FIGs. 3-4 of the originally-filed specification. Thus, no new matter has been added.

Claims 6 and 12 has been amended in light of the amendment to claim 1.

Claim 14 has been amended to end the sentence with a period.

Objection to the Claims:

Claim 14 has been amended as requested by the Examiner to correct a typographical error. Reconsideration and withdrawal of the objection to claim 14 is requested.

35 U.S.C. § 102(b) - Vidmar

Claims 1, 3-13, 20, and 22-26 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,028,928 (Vidmar). Vidmar proposes an inflatable target support for radar cross section (RCS) measurements. Vidmar discusses a right cone 13 created by inflating a membrane. A radio frequency absorber 25 is positioned inside the right cone 13. A radio frequency gasket 26 snugly fits over the chamfer base 14 of the support system.

Vidmar does not show "one or more radio frequency absorbers in a tube shape with tapered protrusions" as recited in amended independent claims 1, 20, and 22. The two radio frequency absorbers shown and described in Vidmar are a broad-band absorber 25 and a gasket 26 for terminating electromagnetic waves. As one of ordinary skill in the art is aware, a standard radio frequency (RF) absorber such as absorber 25 is block of absorber, the block having pyramidal projections. Note that column 16 lines 8-13 of Vidmar mentions Emerson & Cuming as a supplier of absorber 25. An Information Disclosure Statement filed herewith includes an Emerson & Cuming Technical Bulletin "Eccosorb® VHP-NRL: Very High Performance Broadband Pyramidal Absorber" and is

an example of a standard RF absorber applicable to absorber 25. Thus, absorber 25 is not in a tube shape as recited in amended independent claims 1, 20, and 22.

Vidmar's radio frequency gasket 26 is not "a tube shape with tapered protrusions" as recited in claims 1, 20, and 22. Thus, Vidmar's gasket 26 also does not anticipate amended independent claims 1, 20, and 22.

Claims 3-13 depend directly or indirectly upon independent claim 1 and, therefore, are also not anticipated by Vidmar. Claim 21 depends directly upon independent claim 20 and is also not anticipated by Vidmar. Claims 23-26 depend directly or indirectly upon independent claim 22 and are not anticipated by Vidmar. Reconsideration and withdrawal of the rejection of claims 1, 3-13, 20, and 22-26 under 35 U.S.C. § 102(b) as being anticipated by Vidmar is respectfully requested.

35 U.S.C. § 102(b) - Larson

Claims 1, 3-7, 20, 22-23, and 25-26 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,099,244 (Larson). Larson proposes a support pylon 20 for radar cross-section testing. The pylon 20 is constructed from a single piece of low dielectric constant foam as described in column 3 lines 50-64 of Larson.

Foam pylons are well known. See "Obtaining High Quality RCS Measurements with a Very Large Foam Column" by Marion Baggett and Tom Thomas submitted in the accompanying Information Disclosure Statement. Foam columns are constructed from a solid piece of foam and do not include "one or more radio frequency absorbers in a tube shape with tapered protrusions" as recited in amended independent claims 1, 20, and 22. Thus, claims 1, 20, and 22 are not anticipated by Larson.

Claims 3-7 depend directly or indirectly upon independent claim 1 and, therefore, are not anticipated by Larson. Claim 21 depends directly or indirectly upon independent claim 20 and, therefore, is also not anticipated by Larson. Claims 23 and 25-26 depend directly or indirectly upon independent claim 22 and also are not

anticipated by Larson. Reconsideration and withdrawal of the rejection of claims 1, 3-7, 20, and 22-23, and 25-26 under 35 U.S.C. § 102(b) as being anticipated by Larson is respectfully requested.

35 U.S.C. § 102(b) - Tricoles

Claims 1, 3-5, 20, 22, and 25-26 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,274,048 (Tricoles). Tricoles considers a scanning interferometer with a turn table 10 supported on a rotatable shaft 22, which is journaled in a bearing within a turntable base 23. An absorbing material 20 covers the turntable 11 and a support 11 on the turntable. According to FIG. 2 of Tricoles, the absorbing material also seems to cover the turntable base 23.

Tricoles does not show “one or more radio frequency absorbers in a tube shape with tapered protrusions” as recited in amended independent claims 1, 20, and 22. Claims 3-5 depend directly or indirectly upon independent claim 1 and, therefore, are also not anticipated by Tricoles. Claims 25-26 depend directly or indirectly upon independent claim 22 and also are not anticipated by Tricoles. Reconsideration and withdrawal of the rejection of claims 1, 3-5, 20, 22, and 25-26 under 35 U.S.C. § 102(b) as being anticipated by Tricoles is respectfully requested.

35 U.S.C. § 103(a) – Vidmar and Takahashi

Claims 2 and 21 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,028,928 (Vidmar) in view of U.S. Patent No. 5,812,080 (Takahashi). Vidmar was discussed previously. Takahashi discusses a variation on the well-known pyramidal absorber geometry. Instead of pyramidal projections, Takahashi proposes stepped-cylindrical projections. Takahashi, like Vidmar, fails to show “one or more radio frequency absorbers in a tube shape with tapered protrusions” as recited in amended independent claims 1 and 20. The stepped-

cylindrical projections of Takahashi are solid cylinders (cylindrical blocks), not tubes. Thus, dependent claims 2 and 21 are not unpatentable over Vidmar and Takahashi.

35 U.S.C. § 103(a) – Larson and Takahashi

Claims 2 and 21 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,099,244 (Larson) in view of U.S. Patent No. 5,812,080 (Takahashi). Both Larson and Takahashi were discussed previously. Both Larson and Takahashi fail to show “one or more radio frequency absorbers in a tube shape with tapered protrusions” as recited in amended independent claims 1 and 20. Thus, claims 2 and 21 are not unpatentable over Larson and Takahashi.

35 U.S.C. § 103(a) – Tricoles and Takahashi

Claims 2 and 21 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,274,048 (Tricoles) in view of U.S. Patent No. 5,812,080 (Takahashi). Both Tricoles and Takahashi were discussed previously. Both Tricoles and Takahashi fail to show “one or more radio frequency absorbers in a tube shape with tapered protrusions” as recited in amended independent claims 1 and 20. Thus, claims 2 and 21 are not unpatentable over Tricoles and Takahashi.

Allowable Subject Matter

Applicant gratefully acknowledges that the Examiner has indicated that claims 14-19 would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

S U M M A R Y

The application is in condition for allowance and a favorable response at an early date is earnestly solicited. Should the Examiner have any questions, comments, or suggestions, the Examiner is invited to contact Applicant's representative at the telephone number indicated below.

Please charge any fees associated herewith, including extension of time fees, to **Deposit Account 502117.**

Respectfully submitted,

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